Postharvest Loss Ideation Jam
Summary Report

November 13, 2013
8:30am – 12:30pm

Hosted by the Office of Agriculture, Biotechnology, and Textile Trade Affairs
Bureau of Economic and Business Affairs
U.S. Department of State

Key Objectives
1) Define criteria and set priorities for addressing proposed postharvest loss challenges.
2) Assess what open data are needed and available to address specific postharvest loss challenges.
3) Identify inspiring Calls-to-Action that address the priorities and data gaps identified in Objectives 1 and 2.

Executive Summary

The vast majority of people suffering from chronic undernutrition (over 800 million) live in developing countries and depend upon agriculture for income. By 2050 the world's population is expected to reach nine billion, requiring at least a 60% increase in food production to meet the demand for food resulting from growing populations and changes in diet.

According to the Food and Agriculture Organization of the United Nations, roughly one-third of the food produced in the world goes to waste – a staggering 1.3 billion tons every year. In developing countries, food loss takes place after crop harvest, between the field and the market. However, the specific causes of postharvest loss (PHL) vary widely, depending on crop type, region, culture, weather, and farmers' incomes.

Reducing postharvest loss (PHL) is a critical way to improve food security in developing countries without requiring additional production resources. It can contribute to rural development and poverty reduction by improving agribusiness livelihoods. However, there is no one-size-fits-all solution to preventing and reducing PHL. Solutions must be specifically tailored for each food value chain and based upon assessment of where losses occur. For example, lack of appropriate storage facilities may lead to mold growth or pest infestations. Lack of transportation infrastructure may lead to product damage or food spoilage between farm and market.

In order to brainstorm solutions to PHL challenges based on open data, the U.S. Department of State brought together subject matter experts, data experts, private sector representatives, and other stakeholders. The Postharvest Loss Ideation Jam builds upon a number of U.S. government priorities, such as the Open Government Initiative; the virtual Food, Agriculture, and Rural Community on the U.S. government's data sharing website; the Global Open Data Agriculture & Nutrition initiative; and Feed the Future, the U.S. government's global hunger and security initiative, which serves as the principal vehicle through which the United States contributes to the G-8 New Alliance for Food Security and Nutrition.

Event Overview

On November 13, the State Department hosted the roundtable event, "Postharvest Loss Ideation Jam." The event follows on the State Department's event in February, 2013, "Food Security and Minimizing Postharvest Loss: Markets, Applied Research, and Innovation" and brought together 25 subject matter experts, data experts, technologists, entrepreneurs, and innovators from industry, academic institutions, international organizations, and U.S. government agencies to brainstorm open data opportunities to help address PHL.

Edward Kaska, Director of the Office of Agriculture, Biotech & Textile Trade Affairs, delivered welcoming remarks, describing the magnitude and complexity of the problem, as well as the need to better clarify some of the priorities and gaps in data when it comes to PHL challenges. Carrie Freeman, of SecondMuse, provided an overview of event objectives and served as discussion moderator. The event was divided into three sections – prioritization of PHL challenges, a discussion on open data and PHL, and setting of Calls-to-Action.

During the first portion of the discussion, which aimed to set PHL challenge priorities, a number of challenge areas were identified, and five were prioritized for further discussion: lack of market incentives, need for better governance and leadership, absence of systems mapping, need for best practices sharing, and lack of consistent methodologies for data collection.

During the second portion of the discussion, which focused on availability and need for open data to address PHL challenges, participants selected two countries as case studies for discussion: Ghana (maize) and Jamaica (tomatoes). The discussion centered on two challenge priorities, the lack of market incentives and the need for better governance.

During the third portion of the discussion, which focused on setting Calls-to-Action for PHL solutions, participants spoke more broadly on the need for continued awareness-raising of the issue, the need for a common methodology for data collection, and limitations on infrastructure.

Part 1: Define criteria and set priorities for addressing postharvest loss challenges
U.S. embassies proposed locally based postharvest loss challenges, in consultation with USDA, USAID, civil society, academic institutions, farmer organizations, trade associations, and ministries of agriculture and trade. These challenges were discussed at the Postharvest Loss Ideation Jam to assess the potential for innovative solutions based on available data and technology. Participants reviewed proposed postharvest loss challenges, defined criteria, and set postharvest loss challenge priorities.

Factors considered:

- *Existing projects and programs addressing postharvest loss and food security.*
- *Available data and/or needed data that could help address the problem.*
- *Available in-country technology and innovation events and resources.*

See Postharvest Loss Challenges Discussion Paper

Participants generally discussed the need to enhance visibility of PHL as a food security problem that needs to be addressed, to improve information sharing and collaboration, and to better understand available information on PHL in order to determine what data might be needed. In order to better define criteria and set priorities, participants agreed to break into two groups – one focusing on perishable products and the other focusing on non-perishable commodities.

Perishables
During the perishables discussion, a number of PHL challenges were identified:

- Need for government institutions to better provide data on export and domestic markets, regulate and set food safety standards, and prevent theft/larceny.
- Lack of information about markets and consumer demand.
- Lack of access to data on available financing opportunities for farmers.
- Lack of credit and insurance for farmers and food/agricultural businesses.
- Lack of infrastructure, such as roads, food processing centers, and warehouses.
- Need for improved supply chain management, including temperature-controlled supply chains (cold chain), and better tools and metrics to assess food quality along value chains.
- Need for improved capacity building and training on how to reduce PHL along value chains.
- Mitigation of unexpected/extreme climate conditions, such as flooding and drought.

Non-perishables
During the non-perishables discussion, a number of PHL challenges were identified:

- Need for private sector incentives for investment in PHL solutions.
- Lack of market incentives for quality control.
- Lack of harmonization of food safety standards and government regulation.
- Lack of demand-driven markets for cereal crops.
- Lack of smallholder farmer inclusion in the supply chain.
- Need for private sector training and accessible software tools.
- Lack of PHL investment accessibility for smallholder farmers.
- Poor grain warehouse management and training (national and community level).

- Poor governance (national and community level).
- Need for smallholder farmer incentives to maintain food safety standards, such as through subsidy systems (donor groups, private sector, or government funding).
- Lack of sharing of best practices from cash crops (coffee, cocoa) to non-cash crops.
- Connecting smallholder farmer co-ops with the global market to boost production standards.
- Need to better understand what metrics/data would be helpful to encourage investment in PHL solutions.
- Lack of consistent methodology in data collection and inconsistent nomenclature of food loss and waste.

While a number of challenge areas were identified by both the perishables and non-perishables groups, five were prioritized for further discussion: lack of market incentives, need for better governance and leadership, absence of systems mapping, need for best practices sharing, and lack of consistent methodologies for data collection.

Priority challenges:

1. ***Market incentives***

According to the World Food Programme, almost one third of local farming production in sub-Saharan Africa is lost every year due to inadequate postharvest management and household storage. Connecting farmers to markets is one way to improve postharvest efficiency, giving farmers a better sense of how much to produce, store, and transport to market.

Participants emphasized the importance of linking farmers to markets and the need to better understand market incentives. Helping producers understand what is in demand and where the demand is coming from may help them make better decisions on how much to produce and which products to bring to market.

When it comes to linking farmers to markets, the affordability and accessibility of information for farmers must be taken into consideration. Farmers in rural communities may not have access to the internet, but may have cellular phones or extension opportunities. Questions regarding the demand for market data, usefulness of data for end-users, and promotion of data-based tool were also discussed.

On a larger scale, improving supply-chain management has been shown to increase market opportunities for farmers. Mars, PepsiCo, Starbucks, and Walmart are among the companies that use a mix of procurement incentives, financial resources, direct training, and technological assistance to work with producers to increase the quality, reliability, and quantity of production. While industry has demonstrated the benefit of providing technical assistance, using extension programs, and contract farming to improve the supply chain and farming practices, replication of these approaches across regions and commodities in developing countries is not straightforward.

For example, India's lack of a reliable electrical grid, poor road and transportation infrastructure, the disorganized nature of the retail sector, and numerous bureaucratic challenges have severely

limited cold chain development. In countries or regions where a cold chain supply is hard to maintain, participants discussed alternative basic practices, such as canning, which could help reduce PHL and address food safety concerns.

2. Governance and Leadership

Participants noted that while developing countries may have a vested interest in addressing PHL, the lack of government capacity, regulation, and citizen participation pose significant obstacles when it comes to better enabling farmers and small and medium-sized businesses to carry out PHL solutions.

Accessible data on food loss are needed to demonstrate to government officials, policy makers, and stakeholders how PHL prevention measures can improve food security and quality of life, increase investment, and boost exports. Given that PHL challenges vary widely and depend upon a number of factors, useful data/information may include a number of sources: climate conditions, topology, type of crop, size of farms, distance to markets, market conditions, financial conditions, and availability of infrastructure to name a few.

It was noted that government officials and policy makers should have a good understanding of the value of data when it comes to PHL. In addition, there is a need for other stakeholders – smallholder farmers, businesses, consumers – to understand what data means for them and what benefits data collection may yield. Without a demand for data, there can be little political impetus for government and policy makers to support much needed data collection services and institutions. For countries with limited data collection resources, participants discussed ways to encourage countries to take advantage of vetted knowledge accumulated by international research platforms, such as the Asia-Pacific Economic Cooperation forum, the World Bank, the Food and Agriculture Organization of the United Nations, and CGIAR Research Centers.

In addition to discussing the need for governmental data collection, participants also highlighted the importance of establishing and enforcing food safety standards, grades, and certifications based on international standards. Poor storage management can lead to contamination of cereal commodities by molds and mycotoxins thus increasing postharvest loss.

In many developing countries there exist two-tiered systems of standards and regulation – food for exports must meet international standards, but food for domestic consumptions remains lower in quality and safety. The Codex Alimentarius Commission, established by FAO and WHO, develops harmonized international food standards, guidelines, and codes of practice to protect the health of consumers and ensure fair practices in global food trade. Finding ways to encourage countries to harmonize science-based food safety standards and improve data-sharing are critically important for improving food security and reducing PHL.

3. Systems Mapping

Systems mapping is a useful method for evaluating how people and organizations relate. A systems based approach could be used to try to change or improve the way postharvest loss challenges are addressed by helping to build new relationships and collaborations or better assessing current resources.

Participants discussed target audiences and what types of platforms/technologies could be useful for data sharing. For example, the Finance Alliance for Sustainable Trade (FAST) recently launched its first impact report analyzing the social, economic, and environmental impacts that result from investment in sustainable agriculture SMEs in developing countries.

Geographical information systems (GIS) could provide useful geographical tools and visualization functions to address some PHL challenges. For example, through a public-private partnership, researchers from the University of Twente in the Netherlands have developed a smartphone application to help reduce crop loss by providing food transporters, growers, and trader with relevant satellite information.

4. Best Practices Sharing

In order to promote shared best-practices, participants discussed specific case studies, such as Kenya's frozen vegetable export market with the EU and Chile's broad use of public-private partnerships. Participants also discussed the option of comparing countries up and down the Americas, from California and Mexico to Central and South America. International organizations, governments, and academic institutions have already carried out case studies on supply chain systems. The FAO has conducted case studies on the seafood supply chain in Southeast Asia and the Samoa Ministry of Agriculture, Forests, Fisheries and Meteorology has looked at post-harvest challenges and opportunities in the Pacific Island region. A study out of the University of Queensland looked at vibration and GPS tracking information collected during transportation of tomatoes in Fiji to assess behavioral contributors to PHL. Participants discussed the importance of looking to effective institutions and organizations that have already been addressing PHL challenges to assess what approaches and best practices might be applicable to other situations.

5. Data Collection

Participants discussed the importance of data-based decision making and the difference between top down and bottom up data collection. By focusing the discussion on a problem and then looking to see what data are available, participants hoped to help define the larger discussion on open data and transparency. Recent initiatives on the part of the U.S. government, G-8 and other organizations have dramatically increased the availability of open data, leading to new products, business opportunities, and community services.

While there are clear merits for making data publicly available, industry and governments may be reluctant to share information due to privacy or security concerns, commercial/funding restraints, or other disincentives. Another factor to consider is availability of data. When released in its raw form, data may not have practical applications for the general public. Finding ways to make data accessible to the end-user – smallholder farmers, policy makers, consumers – and increasing public awareness on the uses of open data are both necessary in order for data to be usefully applied to solve PHL challenges.

Assess what data are needed and available to address postharvest loss challenges
The Obama Administration's Open Data Policy determines that the default for information generated and stored by the Federal Government is open and accessible for the public and that innovators can use open data to fuel entrepreneurship and economic growth while increasing government transparency and efficiency. Through the Open Data Policy, the U.S. government has launched a virtual Food, Agriculture, and Rural Community to help inform investment and policy strategies related to agricultural production, global food security, poverty, nutrition and human health, rural development, and many other issues.

Many types of data can be relevant to agriculture. Already weather data from NASA satellites are being used in drought forecasting programs such as the Famine Early Warning Systems Network, a USAID-funded collaborative activity that provides early warning and vulnerability information on food security issues. We could do more with open data, exploring the use of geographic information systems, market, crop, nutrition, infrastructure, and other information to improve global food security. We welcome participant ideas on additional open government and non-government data that can fuel entrepreneurs and innovators that are working towards reducing postharvest loss.

Open Data questions to address:

- *What data are available to address postharvest loss challenges?*
- *What data are collected by government or private industry, but not made publicly available?*
- *What data are not available and how could we collect it?*
- *What organizations are already working on postharvest loss and what data are they seeking?*

Participants discussed the value of data and the role of data in decision making. In order to discuss specific applications, participants chose two case studies, Ghana (maize) and Jamaica (tomatoes) for further discussion.

CASE STUDY 1
Country: Ghana
Crop: Maize
Postharvest Loss Challenge: How to create market incentives

Data collected by governments, industry or non-governmental organizations:

- Ghana Statistical Service conducts living standards surveys, measuring demographics, health, education, housing, household income, consumption, expenditure, credit, assets, savings, prices, and employment.
- Ghana Grains Council collects information and through partnership with USAID and ACDI/VOCA, has established a warehouse receipt system under which farmers can store grain and use it as collateral for loans based on its market value.
- Through its Comprehensive Africa Agriculture Development Programme (CAADP), Ghana may collect data on key food commodities.
- The U.S. government Food, Agriculture, and Rural Community includes the Feed the Future Ghana: Baseline Household Survey.
- The World Bank Living Standards Measurement Study and Living Standards Measurement Study – Integrated Surveys on Agriculture may have population-based data.

Data not available, but potentially useful for addressing PHL:

- Financing data and credit availability.
- Weather and climate information.
- Market information for farmers.
- Location of farms, processing centers, and markets.
- Estimates on acreage planted and seasonality of supply.
- Inventory of buyers.
- Cost of transportation (aggregators, millers, suppliers), availability of transportation, and transportation conditions.
- Prevalence of mycotoxins, microorganisms, pesticides, and heavy metals (lack of industry testing, education, and training).
- Accessible data (multiple languages, data in readily usable format).
- Information on optimal return on investment.
- Current market data (for investors and for farmers).
- Crowd sourced data through mobile technology.
- More transparency on the part of governments.
- A better understanding of PHL drivers.
- Livelihood data for smallholder farmers.
- Availability of storage facilities.
- Meteorological data (low-cost weather stations and weather data).
- Co-op data.
- Using correlations as indicators.
- Data collected through USAID programs (Ghana is a focus country for Feed the Future).
- A user-friendly portal listing FTF awards, financial flows, and country projects.
- Information on governance and regulation.

- Information on government priorities and intentions when it comes to exports and markets.

Potential Partners

- U.S. government (USAID/Feed the Future)
- ADM Institute for the Prevention of Postharvest Loss (conducted farmer surveys in Brazil and China and may focus on Ghana in the future).
- The Ghana Ministry of Food and Agriculture (Minister has discussed the need for investment in transport, processing, and packaging facilities as another means of reducing PHL; the Ministry has undertaken measures through extension agents to assist farmers in PHL prevention).
- World Bank.

CASE STUDY 2
Country: Jamaica
Crop: Tomatoes
Postharvest Loss Challenges: How to encourage enabling practices, governance, and regulation policy

Data collected by private industry or other non-governmental organizations:

- Location of farms, crops, quantity, price information collected weekly and published on a government website (note: farmers unlikely to have access to this information).
- Jamaican society sells information books to farmers.
- Information collected from 800+ extension officers and 200,000 farmers.

Data not available, but potentially useful for addressing PHL:

- A list of co-ops in the area, NGOs, CSOs that offer agricultural assistance.
- Legal/judiciary information.
- Information on best agricultural practices.
- Testing of water, soil, and products for pathogens such as *Salmonella*.
- Information on how to align production with market needs and government regulations.
- Assessment of market opportunities for development of local and global markets.
- Pricing information.
- Availability of insurance.
- Identification of larceny "hot spots."
- Government receipt program.
- Location of food banks/donation opportunities.
- Seed availability (improved/optimal varieties).
- Cold chain data/availability.

Potential Partners

- Jamaican government school feeding program.
- Tackling PHL could make a significant contribution to combating hunger and poverty. The FAO, along with other partners, is running the Think, Eat, Save campaign, an initiative that aims to halt the massive quantities of squandered food.
- UNEP, WRI, World Bank, IFPRI, Gates Foundation, industry, U.S. government.
- ADM Institute for the Prevention of Postharvest Loss to publish a literature review this coming Spring.
- IICA (Guatemala) is building a tool to help countries gather data.

Calls-to-Action
Open data is a core pillar of open, collaborative development. By identifying inspiring Calls-to-Action that address the priorities and data gaps identified by Objectives 1 and 2, we hope to engage entrepreneurs and innovators in addressing postharvest loss.

See examples:

- *Hacking for Hunger (http://issuu.com/usaid/docs/hacking_for_hunger_case_study)*
- *Hack for Change (http://hackforchange.org/challenges)*

Increase awareness on postharvest loss
Participants discussed the need for continued awareness raising and continued momentum, highlighting the importance of engaging high-level representatives to champion the challenges of PHL. Finding ways to create political space on the issue is needed both in developed and developing countries.

Make available data more accessible
Participants discussed the potential for developing a map of international platforms on PHL. Also highlighted was the need for a common methodology and set criteria for PHL data collection as well as better organization/access to data/information/knowledge.

Improve access to clean water
Participants discussed the importance of access to clean and safe water in addressing PHL. For example, according to the Water Resources Group 2030, pilot projects in India and China have shown that basic postharvest treatment and transportation improvements for fruits, vegetables, and other high value crops could reduce losses by as much as 20 percent (washing, curing, fungicide applications, better on-site and in-transit storage).

Invest in infrastructure
Participants discussed need for improved infrastructure. The Better Life Alliance, a public-private partnership (USAID), is working to help producers increase sales and decrease PHL through infrastructure investments, such as a wild-food processing plant recently opened in Zambia, which provides producers with a central distributor for their crops.

Mitigate unexpected/extreme climate conditions
According to the World Development Report 2010, it is developing countries that will bear the brunt of climate change effects, even as they strive to overcome poverty and food insecurity. Changes in climate are already affecting development and eroding development gains in some countries. Unexpected/extreme climate conditions are projected to adversely affect agriculture in tropical countries earlier and more heavily than in temperate parts of the world. Crop yields in parts of India and Africa have already been affected by droughts and floods.

Engage young people
Participants discussed the importance of engaging students at universities both domestically and internationally and finding ways to target specific audiences (diaspora populations, local entrepreneurs, students).

Engage the private sector
Small, medium, and large-scale businesses can be important drivers of private-sector solutions. Participants discussed the need for more comprehensive data collection on production levels and PHL and highlighted the value of private sector input on what value chain data could be meaningful and actionable. Identifying new business models could also be useful in addressing some PHL challenges.

Agenda

8:30 am	Welcome – Edward Kaska, Director, Agriculture, Biotech & Textile Trade Affairs
8:35 am	Overview of Roundtable Objectives – Carrie Freeman, SecondMuse
8:40 am	Prioritization of Postharvest Loss Challenges • Breakout discussions • Report out on breakout discussions • Group discussion and setting of top 3-5 Postharvest Loss Challenges
10:30 am	BREAK
10:50 am	Discussion on Open Data and Postharvest Loss
11:50 am	Calls-to-Action
12:30 pm	Closing Statements – Jonathan Shrier, Acting Special Representative for Global Food Security

Participant List

Carrie Freeman (SecondMuse) - *moderator*
John Lamb (Abt Associates)
Grace Kenney (ADM Institute for the Prevention of Postharvest Loss)
Philip de Leon (AGCO)
Vicky Kao (Commerce)
Nicholas Nelson (FAO)
Jordan Dey (GrainPro)
Tom Welke (GSI Group)
David Hatch (IICA)
Joaquin Arias (IICA)
Rex Raimond (Meridian Institute)
Matthew McNaughton (Slashroots)
Amy Diggs (State Department)
Oliva Lopez (State Department)
Heath Saxon (State Department)
Carolyn Shore (State Department)
Elizabeth Mitcham (UC-Davis)
Ahmed Kablan (USAID/BFS)
Timothy Reuter (USAID/BFS)
Kat Townsend (USAID/IDEA)
Jason Chang (USDA/FAS)
Harold Tarver (USDA/FAS)
Erin Akred (USDA/ERS)
Jaspreet Aulakh (USDA/ERS)
Isabel Walls (USDA/OSEC)

Select Articles and Reports

The Food Security and Open Data Challenge: Applications and Lessons from Hacking for Hunger
http://issuu.com/usaid/docs/hacking_for_hunger_case_study

From Tomatoes to Soup
http://www.itc.nl/Pub/News/in2013/in2013-February/From-soup-to-tomatoes.html

Low-Cost Fish Retailing Equipment and Facilities in Large Urban Areas of Southeast Asia
http://www.fao.org/docrep/005/y2258e/y2258e00.htm#Contents

Post-harvest challenges and opportunities in the Pacific Island region
http://www.egfar.org/egfar/lfm/gphi_documents/02_Region_specific_documents/D_Asia_and_the_Pacific_Islands_(APAARI)/02_Background_Documents/01_General_issues/D-1-003-D3_Ph_in_Pacific_Islands.pdf

Postharvest horticultural losses along a commercial tomato supply chain in Fiji
http://www.aglinks.net/sites/default/files/Postharvest%20losses%20Fiji%20tomato%20-%20Underhill.pdf

The World Bank: Exploring Climate and Development
http://climate4development.worldbank.org/

Climate Change Knowledge Portal
http://sdwebx.worldbank.org/climateportal/index.cfm

Open Data Resources for Climate Change
http://data.worldbank.org/climate-change

National Weather Service: Climate Prediction Center
http://www.cpc.ncep.noaa.gov/products/monitoring_and_data/restworld.shtml

Global Change Master Directory: Africa Meteorological Stations
http://gcmd.nasa.gov/KeywordSearch/Metadata.do?Portal=GCMD&KeywordPath=%5BKeyword%3D'MOISTURE'%5D&EntryId=NBId0054_101&MetadataView=Full&MetadataType=0&lbnode=mdlb3

Finance Alliance for Sustainable Trade Report
https://www.fastinternational.org/files/FAST%202013%20Impact%20Report_0.pdf

Select Data Resources

World Bank Data
http://data.worldbank.org/

World Bank: Living Standards Measurement Study
http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/EXTLSMS/0,,contentMDK:21610833~pagePK:64168427~piPK:64168435~theSitePK:3358997,00.html

Apps for Development: Data Sources
http://appsfordevelopment.challengepost.com/details/data

Data.gov: Food, Agriculture, and Rural Community
http://www.data.gov/food/community/food

Further Information

For additional information, find the Office of Agriculture, Biotechnology, and Textile Trade Affairs at http://www.state.gov/e/eb/tpp/abt/postharvest/index.htm, and Feed the Future at http://www.feedthefuture.gov/.